



**AMENDMENTS TO THE CLAIMS:**

Amend the claims as follows:

Claims 1-66. (Canceled)

67. (Currently Amended) A recombinant protein (a) having luciferase activity, (b) having at least 90% similarity to wild-type luciferase from *Photinus pyralis* (SEQ ID NO: 37), and (c) being a mutated wild-type sequence wherein in the sequence of the recombinant protein, ~~at least one of~~

~~(a) the amino acid residue corresponding to residue 214 in *Photinus pyralis* luciferase;~~

~~(b) the amino acid residue corresponding to residue 232 in *Photinus pyralis* luciferase;~~

~~(c) the amino acid residue corresponding to residue 295 in *Photinus pyralis* luciferase;~~

~~(d) the amino acid residue corresponding to amino acid 14 of the *Photinus pyralis* luciferase;~~

~~(e) the amino acid residue corresponding to amino acid 35 of the *Photinus pyralis* luciferase;~~

~~(f) the amino acid residue corresponding to amino acid residue 105 of the *Photinus pyralis* luciferase;~~

~~(g) the amino acid residue corresponding to amino acid residue 234 of the  
*Photinus pyralis* luciferase;~~

~~(h) the amino acid residue corresponding to amino acid residue 420 of the  
*Photinus pyralis* luciferase;~~

~~(i) the amino acid residue corresponding to amino acid residue 310 of the  
*Photinus pyralis* luciferase~~

is different to the amino acid which appears in the corresponding wild-type sequence of *Photinus pyralis* luciferase and wherein the protein has increased thermostability as compared to an enzyme having the amino acid of the corresponding wild-type luciferase at this position.

68. (Previously Presented) A protein according to claim 67 which has the sequence of the *Photinus pyralis* wild-type luciferase except that more than one amino acid residue is different to that of the wild-type luciferase.

69. (Previously Presented) A protein according to claim 68 wherein up to 50 amino acids are different to that of the wild-type luciferase.

70. (Previously Presented) A protein according to claim 67 which is a modified form of luciferase of *Photinus pyralis*.

71. (Currently Amended) A protein according to claim 67 comprising a protein having luciferase activity and at least 90% similarity to wild-type luciferase from *Photinus pyralis* (SEQ ID NO: 37) wherein in the sequence of the protein, ~~at least one of~~

~~(a) the amino acid residue corresponding to residue 214 in *Photinus pyralis* luciferase is mutated and is other than threonine; or~~

~~(b) the amino acid residue corresponding to residue 232 in *Photinus pyralis* luciferase is mutated and is other than isoleucine; or~~

~~(c) the amino acid residue corresponding to residue 295 in *photinus pyralis* luciferase is mutated and is other than phenylalanine;~~

and the protein has increased thermostability as compared to *Photinus pyralis* luciferase, on which the protein is based.

72. (Previously Presented) A protein according to claim 67 wherein the amino acid residue corresponding to residue 214 in *Photinus pyralis* luciferase is alanine.

73. (Previously Presented) A nucleic acid which encodes a protein according to claim 67.

74. (Previously Presented) A vector comprising a nucleic acid according to claim 73.

75. (Previously Presented) A cell transformed with a vector according to claim 74.

76. (Previously Presented) A cell according to claim 75 which is a prokaryotic cell.

77. (Previously Presented) A cell according to claim 75 which is a plant cell.

78. (Currently Amended) A plant comprising a cell according to claim 77.

79. (Currently Amended) In a bioluminescent assay which comprises a luciferase/luciferin reaction and detection of bioluminescence, an improvement comprising contacting the protein according to claim 67 in said reaction compared with contacting the corresponding wild-type luciferase in said reaction.

80. (Previously Presented) A kit comprising a protein according to claim 67.

81. (Previously Presented) A kit according to claim 80 which further comprises luciferin.

82. (Previously Presented) A recombinant protein (a) having luciferase activity, (b) having an amino acid sequence having at least 90% similarity to the amino acid sequence of wild-type *Photinus pyralis* luciferase (SEQ ID NO: 37) and (c) being a mutated wild-type sequence; wherein, in the sequence of the recombinant protein, the amino acid residue corresponding to residue 214 in *Photinus pyralis* luciferase is mutated as compared to the corresponding wild-type luciferase, such that the recombinant protein has enhanced thermostability as compared to the corresponding wild-type luciferase.

83. (Previously Presented) A nucleic acid which encodes a recombinant luciferase according to claim 82.

84. (Currently Amended) A vector comprising the ~~in a vector.~~ nucleic acid of claim 83

85. (Currently Amended) An isolated cell comprising the ~~[[The ]]~~ vector of claim  
84 ~~transformed in a cell.~~